

AMENDMENT UNDER 37 C.F.R. § 1.111
U.S. Application No. 09/892,862
Attorney Docket No. Q65135

REMARKS

Claims 1 and 2 have been examined. New claims 3-8 are added. Therefore, claims 1-8 are pending in the present application.

I. Statement of Substance of Interview

Applicants would like to thank the Examiner for courtesies extended in the telephone interview of July 16, 2003. Applicants submit the following Statement of Substance of the Interview in accordance with 37 C.F.R. § 1.133 and MPEP §713.04. In the interview, the invention was discussed, the grounds of rejection were clarified, and the proposed new claims 3-8 were discussed.

In the interview, the Examiner indicated that the subject matter of the proposed new claims appears to be distinguishable over the applied references. However, the Examiner declined to comment on the allowability of the new claims at that time, pending further search and consideration based on the submission of the present Amendment.

Applicants submit that new claims 3-8 are consistent with the new claims, as discussed in the interview.

II. Summary

The Examiner has entered the Request for Continued Examination (RCE) and the Preliminary Amendment filed on November 26, 2002. Additionally, the Examiner has withdrawn the previous rejection of claims 1 and 2 under 35 U.S.C. § 103(a) as being obvious over Applicants' Admitted Prior Art (APA) in view of Ryang et al. (U.S. Patent No. 6,159,600). In the present, non-final Office Action after RCE, the Examiner rejects claims 1 and 2 under 35

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U.S.C. § 103(a) as being obvious over the APA in view of newly applied Harada (U.S. Patent No. 4,624,884). Applicants' remarks are as follows.

III. Obviousness Rejection

As set forth above, the Examiner rejects claims 1 and 2 under 35 U.S.C. § 103(a) as being obvious over the APA in view of newly applied Harada. In particular, the Examiner acknowledges that Applicants' APA does not disclose conducting wires that are composed of electrically-insulating material that is resistant to permeation by sulfur compounds, as recited in claim 1. Thus, the Examiner looks to Harada to make up for the deficiencies of the APA. In the interview, the Examiner confirmed that the Examiner takes the position that Harada makes up for the deficiencies of the APA by disclosing a heat radiating insulator that is made of a thermosetting resin for a coil of an electric motor of an automobile electric component. For at least the following reasons, Applicants respectfully traverse this rejection.

It is settled law that, when applying 35 U.S.C. § 103, the references must be considered as a whole and must suggest the desirability, and thus, the obviousness of making the combination. *See Hodosh Block Drug Co., Inc.*, 786 F.2d 1136 (Fed. Cir. 1986); see also MPEP 2141.01. In addition, the references must be viewed without the benefit of impermissible hindsight vision afforded by the claimed invention. *See id.* Further, "[a] patentable invention may lie in the discovery of the source of a problem even though the remedy may be obvious once the source of the problem is identified. This is part of the 'subject matter as a whole' which should always be considered in determining the obviousness of the invention under 35 U.S.C. § 103." *In re Spinnoble*, 405 F.2d, 578, 585 (CCPA 1969).

As set forth in the specification, Applicants' APA teaches a stepping motor having a conducting wire coated with an electrically-insulating layer composed of a thermoplastic polyimide resin (see page 3, third full paragraph). However, when the conventional stepping motor is mounted to an automobile continuously variable transmission, it is entirely immersed in oil that contains sulfur and organosulfur compounds (see page 4, lines 13-26, of Applicants' specification). In a conventional stepping motor immersed in oil and mounted to an automobile continuously variable transmission, there were problems with wire breakage or short circuiting between conducting wires on a bobbin. However, nobody considered or determined what the cause may be, i.e. the source of the problem. Therefore, the coils of the prior art were constructed by using conducting wire formed by coating the copper wire with an insulating layer composed of a thermoplastic polyimide resin. In the present application, Applicants disclosed that they discovered that sulfur and organosulfur compounds in the oil cause or contribute to these problems. For example, as disclosed by Applicants in the specification, Applicants have discovered that, when the stepping motor is immersed in oil, the sulfur and the organosulfur compounds in the oil can permeate the electrically-insulating layer coated on the copper wire to reach the surface of the copper wire. As a result, Applicants have discovered that chemical reactions occur at the surface of the copper wire, giving rise to problems with reduced adhesive strength of the electrically-insulating layer to the copper wire. Additionally, Applicants have discovered that, when the temperature of the oil becomes greater than vaporization temperatures of volatile components in the oil due to heat generated by the coils, the electrically-insulating layer of the conducting wires is more likely to be permeated by sulfur and there is a greater

likelihood of short circuiting occurring between the conducting wires (see page 5, lines 9-14, of Applicants' specification).

Thus, Applicants discovered that (in an electromagnetic device that is to be mounted to an automotive transmission and used in oil containing sulfur) wire-breakage resistance and short circuiting resistance of the conducting wire can be improved by providing an electrically insulating layer by coating a thermosetting resin, specifically, a thermosetting epoxy resin, a modified polyimide resin, or a phenol resin, on the copper wire instead of a thermoplastic resin.

In particular, claim 1 recites, *inter alia*:

“an electrically-insulating layer coated on said conducting wire; and
means for preventing sulfur compounds from permeating said electrically-insulating layer and attendantly reducing the formation of sulfur compounds on a surface of said conducting wire, thereby suppressing the reduction in adhesive of the electrically-insulating layer to said conducting wire, wire breakage, and short circuiting between said conducting wires,
said preventing means comprising said electrically-insulating layer of a material resistant to permeation by sulfur compounds.”

In comparison, neither the APA nor Harada contemplates (or even mentions) the foregoing problems, or for that matter, the source of such problems. Thus, Applicants submit that, when considered as a whole, it would not have been obvious to combine the APA and Harada to arrive at the claimed combination, since neither of these references provides any motivation or suggestion for such a combination.